Amendments to the Claims:

This listing of claims will replace all prior version, and listings, of claims in the application.

Listing of Claims:

1 (currently amended) A method for obtaining an optimal reflectivity value for complex multilayer stacks, comprising:

(a) generating a model of a multilayer stack and parameterizing each layer by a thickness and an index of refraction;

(b) allowing a user to input values for the parameters and to designate a plurality of the parameters as independent variables;

(c) calculating an extrema for a cost function of reflectivity R using the input parameter values;

(d) calculating sensitivity values S for the extrema ~~points~~; and

(e) obtaining ~~an~~ the optimal reflectivity value by calculating a cost function $R + S$ using the plurality of independent variables at once.

2 (original) The method of claim 1 wherein step (e) further includes the step of: calculating the cost function as $R + \alpha S$, where α is a weighted parameter.

3 (original) The method of claim 1 wherein step (a) further includes the step of: providing the multilayer stack with N layers, where a top layer comprises a top ambient resist layer followed by one or more layers of materials that are patterned over a substrate layer.

4 (original) The method of claim 2 wherein step (a) further includes the step of: providing the index of refraction to include a real and an imaginary number.

5 (original) The method of claim 4 wherein step (a) further includes the step of: providing a j^{th} layer with thickness d_j, and a complex index of refraction $\mathbf{n}_j = n_j - i\,k_j$.

6 (original) The method of claim 5 wherein step (a) further includes the step of: providing the ambient and substrate with complex indexes of refraction: $\mathbf{n}_0 = n_0 - i\,k_0$ and $\mathbf{n}_{N+1} = n_{N+1} - i\,k_{N+1}$, respectively.

7 (original) The method of claim 6 wherein step (a) further includes the step of: defining reflectivity at an interface between two layers as a cost function, wherein the reflectivity R_j at a j^{th} interface (between the $(j-1)^{th}$ and j^{th} layers) is a function of $3(N - j + 1) + 4$ parameters, which are ; $n_{j-1}, n_j \ldots n_N, n_{N+1}; k_{j-1}, k_j \ldots k_N, k_{N+1}; d_j, d_{j+1} \ldots d_N$.

8 (currently amended) The method of claim 1 wherein step (b) further includes the step of: allowing the user to enter values for the thickness and the complex indexes of refraction (n and k) for each layer, including a current starting point, a minimum value~~s~~, and a maximum value for the thickness and the complex indexes of refraction for each layer.

9 (currently amended) The method of claim 8 wherein step (b) further includes the step of: allowing the user to ~~choose which of the parameters will be independent variables and to~~ enter step values for the parameters designated as independent variables, wherein those parameters that are not designated as ~~varying~~ independent variables are fixed.

10 (original) The method of claim 1 wherein step (e) further includes the step of: defining the sensitivity as $S = (\text{Max } R - \text{Min } R)$ for all varied parameters.

11 (currently amended) A computer-readable medium containing program instructions for obtaining an optimal reflectivity value for complex multilayer stacks, the instructions for:

(a) generating a model of a multilayer stack and parameterizing each layer by a thickness and an index of refraction;

(b) allowing a user to input values for the parameters and to designate a plurality of parameters as independent variables;

(c) calculating an extrema for a cost function of reflectivity R using the input parameter values;

(d) calculating sensitivity values S for the extrema ~~points~~; and

(e) obtaining ~~an~~ the optimal reflectivity value by calculating a cost function $R + S$ using the plurality of independent variables at once.

12 (original) The computer-readable medium of claim 11 wherein instruction (e) further includes the instruction of: calculating the cost function as $R + \alpha S$, where α is a weighted parameter.

13 (original) The computer-readable medium of claim 11 wherein instruction (a) further includes the instruction of: providing the multilayer stack with N layers, where a top layer comprises a top ambient resist layer followed by one or more layers of materials that are patterned over a substrate layer.

14 (original) The computer-readable medium of claim 13 wherein instruction (a) further includes the instruction of: providing the index of refraction to include a real and an imaginary number.

15 (original) The computer-readable medium of claim 14 wherein instruction (a) further includes the instruction of: providing a j^{th} layer with thickness d_j, and a complex index of refraction $\mathbf{n}_j = n_j - i\,k_j$.

16 (original) The computer-readable medium of claim 15 wherein instruction (a) further includes the instruction of: providing the ambient and substrate with complex indexes of refraction: $\mathbf{n}_0 = n_0 - i\,k_0$ and $\mathbf{n}_{N+1} = n_{N+1} - i\,k_{N+1}$, respectively.

17 (original) The computer-readable medium of claim 16 wherein instruction (a) further includes the instruction of: defining reflectivity at an interface between two layers as a cost function, wherein the reflectivity R_j at a j^{th} interface (between the $(j-1)^{th}$ and j^{th} layers) is a function of $3(N-j+1)+4$ parameters, which are ; n_{j-1}, $n_j \ldots n_N$, n_{N+1}; k_{j-1}, $k_j \ldots k_N$, k_{N+1}; d_j, $d_{j+1} \ldots d_N$.

18 (currently amended) The computer-readable medium of claim 11 wherein instruction (b) further includes the instruction of: allowing the user to enter values for the thickness and the complex indexes of refraction (n and k) for each layer, including a current starting point, a minimum values, and a maximum value for the thickness and the complex indexes of refraction for each layer.

19 (currently amended) The computer-readable medium of claim 18 wherein instruction (b) further includes the instruction of: allowing the user to ~~choose which of the parameters will be independent variables and to e~~nter ~~instruction~~ step values for the parameters designated as independent variables, wherein those parameters that are not designated as ~~varying~~ independent variables are fixed.

20 (original) The computer-readable medium of claim 11 wherein instruction (e) further includes the instruction of: defining the sensitivity as S = (Max R – Min R) for all varied parameters.